



NEB-166-PUS.APP.txt
SEQUENCE LISTING

<110> JACK, WILLIAM E.
GARDNER, ANDREW
BUZBY, PHILIP R.
DiMEO, JAMES J.
NEW ENGLAND BIOLABS, INC.
NEN LIFE SCIENCE PRODUCTS, INC:

<120> INCORPORATION OF MODIFIED NUCLEOTIDES BY ARCHAEON DNA
POLYMERASES AND RELATED METHODS

<130> NEB-166-PUS

<140> 10/089,027
<141> 2002-03-26

<150> PCT/US00/26900
<151> 2000-09-29

<150> 60/157,204
<151> 1999-09-30

<160> 33

<170> PatentIn Ver. 2.0

<210> 1
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 1
caggcagagg cttataaaaa tcctcgccaa cagctt 36

<210> 2
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 2
ggtggcagca gccaaactcag cttcct 26

<210> 3
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 3
gattctcatg ataagctacg ccga 24

<210> 4
 <211> 5837
 <212> DNA
 <213> *Thermococcus litoralis*

<400> 4
 gaattcgcga taaaatctat tttcttcctc cattttttcaa tttcaaaaac gtaagcatga 60
 gccaaacctc tcgccctttc tctgtccttc ccgctaaccc tcttgaaaac tctctccaaa 120
 gcattttttg atgaaagctc acgctcctct atgaggggtca gtatatctgc aatgagttcg 180
 tgaaggggta ttctgtagaa caactccatg attttcgatt tggatggggg tttaaaaatt 240
 tggcggaact tttatttaat ttgaactcca gtttatatct ggtggtattt atgatactgg 300
 aactgatta cataacaaaa gatggcaagc ctataatccg aatttttaag aaagagaacg 360
 gggagttaa aatagaactt gaccctcatt ttcagcccta tatatatgct cttctcaaag 420
 atgactccgc tattgaggag ataaaggcaa taaagggcga gagacatgga aaaactgtga 480
 gagtgctcga tgcagtgaat gtcaggaaaa aatttttggg aagggaagtt gaagtctgga 540
 agctcatttt cgagcatccc caagacgttc cagctatgcg gggcaaaaata agggaacatc 600
 cagctgtggg tgacatttac gaatatgaca taccctttgc caagcgttat ctcatagaca 660
 agggcttgat tcccatggag ggagacgagg agcttaagct ccttgccctt gatattgaaa 720
 cgttttatca tgaggagat gaatttggaa agggcgagat aataatgatt agttatgccg 780
 atgaagaaga ggccagagta atcacatgga aaaatatcga tttgccgtat gtcgatgttg 840
 tgtccaatga aagagaaatg ataaagcgtt ttgttcaagt tgttaaagaa aaagaccccg 900
 atgtgataat aacttacaat ggggacaatt ttgatttggc gtatctcata aaacgggcga 960
 aaaagctggg agttcggctt gtcttaggaa gggacaaaaga acatcccga cccaagattc 1020
 agaggatggg tgatagtttt gctgtggaaa tcaagggtag aatccacttt gatcttttcc 1080
 cagttgtgcg aaggacgata aacctcccaa cgtatacgct tgaggcagtt tatgaagcag 1140
 ttttaggaaa aacccaaagc aaattaggag cagaggaaat tgccgctata tgggaaacag 1200
 aagaaagcat gaaaaaacta gcccagttact caatggaaga tgctagggca acgtatgagc 1260
 tcgggaagga attcttcccc atggaagctg agctggcaaa gctgataggt caaagtgtat 1320
 gggacgtctc gatgtcaagc accggcaacc tcgtggagtg gtatctttta aggggtggcat 1380
 acgcgaggaa tgaacttgca ccgaacaaac ctgatgagga agagtataaa cggcgcttaa 1440
 gaacaactta cctgggagga tatgtaaaag agccagaaaa aggtttgtgg gaaaatatca 1500
 tttatttgga tttccgcagt ctgtaccctt caataatagt tactcacaac gtatccccag 1560
 atacccttga aaaagagggc tgtaagaatt ccgatgttgc tccgatagta ggatataggt 1620
 tctgcaagga ctttccgggc tttattccct cctactcgg ggacttaatt gcaatgaggc 1680
 aagatataaa gaagaaaaatg aaatcccaa ttgaccgat cgaaaagaaa atgctcgatt 1740
 ataggcaaa ggctattaaa ttgcttgcaa acagcatctt acccaacgag tggttacca 1800
 taattgaaaa tggagaaata aaattcgtga aaattggcga gtttataaac tcttacatgg 1860
 aaaaacagaa ggaaaacgtt aaaacagtag agaatactga agttctcgaa gtaaacacc 1920
 tttttgcatt ctcatccaac aaaaaaatca aagaaagtga agtcaaaaaa gtcaaagccc 1980
 tcataagaca taagtataaa gggaaagctt atgagattca gcttagctct ggtagaaaaa 2040
 ttaacataac tgctggccat agtctgttta cagttagaaa tggagaaata aagggaagtt 2100
 ctggagatgg gataaaagaa ggtgacctta ttgtagcacc aaagaaaatt aaactcaatg 2160
 aaaaaggggt aagcataaac attcccaggt taatctcaga tctttccgag gaagaaacag 2220
 ccgacattgt gatgacgatt tcagccaagg gcagaaagaa cttcttttaa ggaatgctga 2280
 gaactttaag gtggatgttt ggagaagaaa atagaaggat aagaacattt aatcgctatt 2340
 tgttccatct cgaaaaacta ggccttatca aactactgcc ccgcgatat gaagttactg 2400
 actgggagag attaaagaaa tataaacaac tttacgagaa gcttgctgga agcgttaggt 2460
 acaacggaaa caagagagag tatttagtaa tgttcaacga gatcaaggat tttatatctt 2520
 acttcccaca aaaagagctc gaagaatgga aaattggaac tctcaatggc tttagaacga 2580
 attgtattct caaagtcgat gaggattttg ggaagctcct aggttactat gttagttagg 2640
 gctatgcagg tgcacaaaaa aataaaactg gtggtatcag ttattcgggt aagctttaca 2700
 atgaggaccc taatgttctt gagagcatga aaaatgttgc agaaaaattc tttggcaagg 2760
 tttagagttga cagaaattgc gtaagtatat caaagaagat ggcatactta gttatgaaat 2820
 gcctctgtgg agcattagcc gaaaacaaga gaattccttc tgttatactc acctctccc 2880
 aaccggtacg gtggtcattt ttagaggcgt attttacagg cgatggagat atacatccat 2940
 caaaaagggt taggctctca acaaaaagcg agctccttgc aaatcagctt gtgttcttgc 3000
 tgaactcttt gggaaatcca tctgtaaaaga taggctttga cagtggggtc tatagagtgt 3060
 atataaatga agacctgcaa tttccacaaa cgtctaggga gaaaaacaca tactactcta 3120
 acttaattcc caaagagatc cttagggacg tgtttggaaa agagttccaa aagaacatga 3180
 cgttcaagaa atttaaagag cttgttgact ctggaaaact taacagggag aaagccaagc 3240
 tcttgaggtt cttcattaat ggagatatgt tccttgacag agtcaaaagt gttaaagaaa 3300
 aggactatga agggatgtgc tatgacctaa gcgttgagga taacgagaac tttcttgttg 3360
 gttttgggtt gctctatgct cacaacagct attacggcta tatggggtat cctaaggcaa 3420

NEB-166-PUS.APP.txt

```

gatgggtactc gaaggaatgt gctgaaagcg ttaccgcatg ggggagacac tacatagaga 3480
tgacgataag agaaatagag gaaaagttcg gctttaaggt tctttatgcg gacagtgtct 3540
caggagaaag tgagatcata ataaggcaaa acggaaagat tagatttgtg aaaataaagg 3600
atcttttctc taaggtggac tacagcattg gcgaaaaaga atactgcatt ctcgaagggtg 3660
ttgaagcact aactctggac gatgacggaa agcttgtctg gaagcccgtc ccctacgtga 3720
tgaggcacag agcgaataaa agaattgtcc gcatctggct gaccaacagc tggatatatag 3780
atgttactga ggatcattct ctcataggct atctaaacac gtcaaaaacg aaaactgcca 3840
aaaaaatcgg ggaaagacta aaggaagtaa agccttttga attaggcaaa gcagtaaaat 3900
cgctcatatg cccaaatgca ccgttaaagg atgagaatac caaaactagc gaaatagcag 3960
taaaattctg ggagctcgta ggattgattg taggagattg aaactggggt ggagattctc 4020
gttgggcaga gtattatctt ggactttcaa caggcaaaaga tgcagaagag ataaagcaaa 4080
aacttctgga acccctaaaa acttatggag taatctcaa ctattacca aaaaacgaga 4140
aaggggactt caacatcttg gcaaagagcc ttgtaaagtt tatgaaaagg cactttaagg 4200
acgaaaaagg aagacgaaaa attccagagt tcatgtatga gcttccggtt acttacatag 4260
aggcatttct acgaggactg ttttcagctg atgggtactgt aactatcagg aaggggagttc 4320
cagagatcag gctaacaacg attgatctg actttctaag ggaagtaagg aagcttctgt 4380
ggattgttgg aatttcaaat tcaatatatt ctgagactac tccaaatcgc tacaatggtg 4440
tttctactgg aacctactca aagcatctaa ggatcaaaaa taagtggcgt tttgctgaaa 4500
ggataggctt tttaatcgag agaaagcaga agagactttt agaacattta aaatcagcga 4560
gggtaaaaag gaataccata gatatttggct ttgatcttgt gcatgtgaaa aaagtccaag 4620
agataccata cgagggttac gtttatgaca ttgaagtcca agagacgcat aggttctttg 4680
caaacaacat cctggtacac aatactgacg gcttttatgc cacaatacc ggggaaaagc 4740
ctgaactcat taaaaagaaa gccaaaggaat tcctaaacta cataaactcc aaacttccag 4800
gtctgcttga gcttgagtat gagggctttt acttgagagg attctttgtt acaaaaaagc 4860
gctatgcagt catagatgaa gagggcagga taacaacaag gggcttgga gtagtaagga 4920
gagattggag tgagatagct aagggagactc aggcaaaggt tttagaggct atacttaaaag 4980
agggaaagtgt tgaaaaagct gtagaagttg ttagagatgt ttagagaaa atagcaaaat 5040
acagggttcc acttgaaaag cttgttatcc atgagcagat taccagggat ttaaaggact 5100
acaaagccat tggccctcat gtcgcgatag caaaaagact tgccgcaaga gggataaaaag 5160
tgaaaccggg cacaataata agctatatcg ttctcaaagg gagcggaag ataagcgata 5220
gggtaatatt acttacagaa tacgatccta gaaaacacaa gtacgatccg gactactaca 5280
tagaaaacca agttttgccc gcagacttta ggatactcga agcgtttgga tacagaaagg 5340
aggatttaag gtatcaaagc tcaaaacaaa ccggcttaga tgcattggctc aagaggtagc 5400
tctgttgctt tttagtccaa gtttctccgc gagtctctct atctctcttt tgtattctgc 5460
tatgtggttt tcattacta ttaagtagtc cgccaaagcc ataacgcttc caattccaaa 5520
cttgagctct ttcagctctc tggcctcaaa ttactccat gtttttggat cgtcgttctc 5580
ccctcttctg ctaagcctct cgaatctttt tcttggcgaa gagtgtacag ctatgatgat 5640
tatctcttcc tctggaaacg catcttttaa cgtctgaatt tcatctagag acctcactcc 5700
gtcgattata actgccttgt acttcttttag tagttctttt accttggga tcgttaattt 5760
tgccacggca ttgtcccaa gctcctgcct aagctgaatg ctcacactgt tcataccttc 5820
gggagttctt gggatcc 5837

```

<210> 5

<211> 15

<212> PRT

<213> *Thermococcus litoralis*

<400> 5

```

Ala Ile Lys Leu Leu Ala Asn Ser Tyr Tyr Gly Tyr Met Gly Tyr
 1             5             10             15

```

<210> 6

<211> 15

<212> PRT

<213> *Pyrococcus Sp. (GB-D)*

<400> 6

```

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
 1             5             10             15

```

<210> 7

<211> 15

<212> PRT

<213> Thermococcus sp.

<400> 7

Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 8

<211> 15

<212> PRT

<213> Pyrococcus furiosus

<400> 8

Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 9

<211> 15

<212> PRT

<213> Thermococcus fumicolans

<400> 9

Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 10

<211> 15

<212> PRT

<213> Thermococcus gorgonarius

<400> 10

Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 11

<211> 15

<212> PRT

<213> Thermococcus sp. (TY)

<400> 11

Ala Val Lys Leu Leu Ala Asn Ser Tyr Tyr Gly Tyr Met Gly Tyr
1 5 10 15

<210> 12

<211> 15

<212> PRT

<213> Pyrococcus abyssi

<400> 12

Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 13

<211> 15

<212> PRT

<213> Pyrococcus glycovoraans

<400> 13
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 14
<211> 15
<212> PRT
<213> Pyrococcus horikoshii

<400> 14
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 15
<211> 15
<212> PRT
<213> Pyrococcus sp. (GE23)

<400> 15
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 16
<211> 15
<212> PRT
<213> Pyrococcus Sp. (KOD1)

<400> 16
Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 17
<211> 15
<212> PRT
<213> Pyrococcus woesei

<400> 17
Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr
1 5 10 15

<210> 18
<211> 15
<212> PRT
<213> Archaeoglobus fulgidus

<400> 18
Thr Leu Lys Val Leu Thr Asn Ser Phe Tyr Gly Tyr Met Gly Trp
1 5 10 15

<210> 19
<211> 15
<212> PRT
<213> Cenarchaeum symbiosum

<400> 19
Ala Leu Lys Val Val Leu Asn Ala Ser Tyr Gly Val Met Gly Ala
Page 5

1 5 10 15

<210> 20
 <211> 15
 <212> PRT
 <213> Methanococcus jannaschii

<400> 20
 Ser Ile Lys Ile Leu Ala Asn Ser Val Tyr Gly Tyr Leu Ala Phe
 1 5 10 15

<210> 21
 <211> 15
 <212> PRT
 <213> Methanococcus voltae

<400> 21
 Ser Ile Lys Val Leu Ala Asn Ser His Tyr Gly Tyr Leu Ala Phe
 1 5 10 15

<210> 22
 <211> 15
 <212> PRT
 <213> Pyrodictium occultum

<400> 22
 Ala Leu Lys Val Leu Ala Asn Ala Ser Tyr Gly Tyr Met Gly Trp
 1 5 10 15

<210> 23
 <211> 15
 <212> PRT
 <213> Sulfurisphaera ohwakuensis

<400> 23
 Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala
 1 5 10 15

<210> 24
 <211> 15
 <212> PRT
 <213> Sulfolobus acidocaldarius

<400> 24
 Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala
 1 5 10 15

<210> 25
 <211> 15
 <212> PRT
 <213> Sulfolobus solfataricus

<400> 25
 Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly Val Phe Gly Ala
 1 5 10 15

<210> 26
 <211> 15
 <212> PRT
 <213> Herpesvirus

<400> 26
 Ala Ile Lys Val Val Cys Asn Ser Val Tyr Gly Phe Thr Gly Val
 1 5 10 15

<210> 27
 <211> 15
 <212> PRT
 <213> human herpesvirus 2

<400> 27
 Ala Ile Lys Val Val Cys Asn Ser Val Tyr Gly Phe Thr Gly Val
 1 5 10 15

<210> 28
 <211> 15
 <212> PRT
 <213> Human cytomegalovirus

<400> 28
 Ala Leu Lys Val Thr Cys Asn Ala Phe Tyr Gly Phe Thr Gly Val
 1 5 10 15

<210> 29
 <211> 15
 <212> PRT
 <213> Human DNA Polymerase alpha

<400> 29
 Ala Leu Lys Leu Thr Ala Asn Ser Met Tyr Gly Cys Leu Gly Phe
 1 5 10 15

<210> 30
 <211> 15
 <212> PRT
 <213> Phage T4

<400> 30
 Asn Arg Lys Ile Leu Ile Asn Ser Leu Tyr Gly Ala Leu Gly Asn
 1 5 10 15

<210> 31
 <211> 631
 <212> DNA
 <213> Consensus using 9 degrees N or AmpliTaq

<220>
 <221> misc_feature
 <222> (2)..(3)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature

<222> (5)..(5)
<223> s is g or c

<220>
<221> misc_feature
<222> (11)..(12)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (14)..(14)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (18)..(18)
<223> s is g or c

<220>
<221> misc_feature
<222> (28)..(28)
<223> s is g or c

<220>
<221> misc_feature
<222> (35)..(35)
<223> k is g or t

<220>
<221> misc_feature
<222> (39)..(39)
<223> k is g or t

<220>
<221> misc_feature
<222> (46)..(46)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (63)..(63)
<223> y is c or t

<220>
<221> misc_feature
<222> (77)..(77)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (84)..(84)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (128)..(128)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (152)..(152)
<223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (372)..(372)
 <223> y is c or t

<220>
 <221> misc_feature
 <222> (518)..(518)
 <223> m is a or c

<220>
 <221> misc_feature
 <222> (530)..(530)
 <223> m is a or c

<220>
 <221> misc_feature
 <222> (544)..(544)
 <223> k is g or t

<220>
 <221> misc_feature
 <222> (565)..(565)
 <223> w is a or t

<220>
 <221> misc_feature
 <222> (587)..(588)
 <223> k is g or t

<220>
 <221> misc_feature
 <222> (593)..(593)
 <223> w is a or t

<220>
 <221> misc_feature
 <222> (596)..(596)
 <223> m is a or c

<220>
 <221> misc_feature
 <222> (616)..(616)
 <223> k is g or t

<220>
 <221> misc_feature
 <222> (621)..(621)
 <223> k is g or t

<400> 31
 tnntsggaaa nncnggcsat tgccaatstt gcatkcctkc aggtcngact ctagaggatc 60
 ccygggtacc gagctcngaa ttcngtaatc atggtcatag ctgtttcctt gtgtgaaatt 120
 gttatcngc tcacaattcc acacaacata cngagccgga agcataaagt gttaaagcctg 180
 ggggtgcctaa tgagtgaagt aactcacatt aattgcgttg cgctcacttg cccgctttcc 240
 agtcgggaaa cctgtcgtgc cagctgcatt aatgaatcgg ccggagaggc ggtttgcgta 300
 ttgggcgcca ggggtggtttt tcttttcacc agtgagacgg gcaacagctg attgcccttc 360

NEB-166-PUS.APP.txt

accgcctggc cytgagagag ttgcagcaag cgggtccacgc tggtttgccc cagcaggcga 420
 aaatatggtg gttccgaaat cggcaaaatc ccttataaat caaaagaata gccccgagat 480
 aggggttgaag tggtgttcca gtttggaaca agagtccmct attaaagaam gtggactcca 540
 acgkcaaagg gcgaaaaacc gtctwtcagg ggcgatggcc actacgkkaa ccwtcmccta 600
 atcaagtttt tggggkcgag kggccgttaa gccta 635

<210> 32
 <211> 615
 <212> DNA
 <213> M13mp18 bacteria phage DNA

<220>
 <221> misc_feature
 <222> (2)..(3)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (6)..(6)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (21)..(21)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (468)..(468)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (532)..(532)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (535)..(535)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (560)..(560)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (577)..(577)
 <223> n is a, c, g, or t

<400> 32
 tnntcnacgg ccattgccaa ncttgcatgc ctgcaggctg actctagagg atccccgggt 60
 accgagctcg aattcgtaat catggtcata gctgtttcct gtgtgaaatt gttatccgct 120
 cacaattcca cacaacatac gagccggaag cataaagtgt aaagcctggg gtgcctaagt 180

NEB-166-PUS.APP.txt

```

agtgagctaa ctcacattaa ttgcgttgcg ctcaactgccc gctttccagt cgggaaacct 240
gtcgtgccag ctgcattaat gaatcggccg gagaggcggg ttgcgtattg ggcgccaggg 300
tggtttttct tttcaccagt gagacgggca acagctgatt gcccttcacc gcctggccct 360
gagagagttg cagcaagcgg tccacactgg tttgccccag caggcgaaaa tatggtgggt 420
ccgaaatcgg caaaatccct tataaatcaa aagaatagcc cgagatangg ttgaagtgtt 480
gttccagttt ggaacaagag tccactatta aagaaagtgg actccaacgt cnaanggcga 540
aaaaccgtct atcaggggcn atggccacta cgttaancat caccaatcaa tttttggggg 600
cagtgcctaa gccta 615

```

```

<210> 33
<211> 602
<212> DNA
<213> M13mp18 bacteria phage DNA

```

```

<220>
<221> misc_feature
<222> (8)..(9)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (11)..(11)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (20)..(20)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (26)..(27)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (31)..(31)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (35)..(35)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (40)..(40)
<223> n is a, c, g, or t

```

```

<220>
<221> misc_feature
<222> (46)..(46)
<223> n is a, c, g, or t

```

<220>
<221> misc_feature
<222> (60)..(60)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (68)..(68)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (75)..(75)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (119)..(119)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (124)..(124)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (132)..(132)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (139)..(139)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (143)..(143)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (173)..(174)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (194)..(194)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (196)..(196)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (210)..(210)
<223> n is a, c, g, or t

<220>
<221> misc_feature

<222> (213)..(213)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (220)..(220)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (246)..(246)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (252)..(252)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (297)..(297)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (326)..(326)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (329)..(329)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (342)..(342)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (349)..(349)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (365)..(365)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (368)..(368)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (378)..(378)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (419)..(419)
<223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (428)..(428)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (435)..(435)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (454)..(454)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (502)..(502)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (537)..(537)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (551)..(551)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (571)..(571)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (597)..(597)
 <223> n is a, c, g, or t

<400> 33
 tgggaaannc nggcgagccn atgttnnatt ncttnaggcn gctctngagg atccctgggn 60
 ccggctcnga attcngtaat catggtcata gctgtttcct tgtgtgaaat tggtatccng 120
 ctncaatc cncacaant acngagccgg aagctaaagt gtaaagctgg ggnnctaata 180
 agtgagctaa ctncnttaa ttgcgttgcn tcncttgccn gtttccagtc gggaaactgt 240
 cgtgcngctg cnttaataa tcggccggag aggcgggttg cgtattgggc gcagggnggt 300
 ttttcttttc accagtgaga cgggcnacng tgattgcctt cncgctgnc cttgagagag 360
 ttgcnagnag cgggtccntg gtttgccag cagggaat atgggtgtcc gaaatcggna 420
 aatcctnta aatcnaaaga atagccccga gatnggggtg agtgtgtcc agtttggaac 480
 aagagcccct attaaagaac gnggactcca acggcaaagg gcgaaaaacc gctttcnggg 540
 cgatggccct ncggaacct tcccctaatac nagtttttgg gggcgagggg ccggtangcc 600
 ta 602